

Having thus defined the invention, the following is claimed:

1. An electric arc welder comprising a gated bridge driven by the secondary of an input transformer with an output connected across the electrode and workpiece of a welding operation through a DC choke and a background current circuit including a full-wave rectifier with an AC input and a rectified DC output and a current control resistance, said background current circuit
5 connected in series with said welding operation and said DC choke, wherein said input of said full wave rectifier is connected in parallel with said secondary winding driving said gated bridge.

2. An electric arc welder as defined in claim 1 wherein said gated bridge includes alternately gated SCRs.

3. An electric arc welder as defined in claim 2 wherein said gated bridge is parallel with said welding operation to perform DC welding.

4. An electric arc welder as defined in claim 1 wherein said gated bridge is parallel with said welding operation to perform DC welding.

5. An electric arc welder as defined in claim 2 wherein said gated bridge is in series with said welding operations to perform AC welding.

6. An electric arc welder as defined in claim 1 wherein said gated bridge is in series with said welding operations to perform AC welding.

7. An electric arc welder as defined in claim 6 wherein said gated bridge includes a first set of gated switches operated during a first polarity for a first given portion of such first polarity and a second set of gated switches operated during a polarity opposite to said first polarity for a second given portion of said opposite polarity.

8. An electric arc welder as defined in claim 4 wherein said gated bridge includes a first set of gated switches operated during a first polarity for a first given portion of such first polarity and a second set of gated switches operated during a polarity opposite to said first polarity for a second given portion of said opposite polarity.

9. An electric arc welder as defined in claim 2 wherein said gated bridge includes a first set of gated switches operated during a first polarity for a first given portion of such first polarity and a second set of gated switches operated during a polarity opposite to said first polarity for a second given portion of said opposite polarity.

10. An electric arc welder as defined in claim 1 wherein said gated bridge includes a first set of gated switches operated during a first polarity for a first given portion of such first polarity and a second set of gated switches operated during a polarity opposite to said first polarity for a second given portion of said opposite polarity.

11. An electric arc welder as defined in claim 6 wherein said background current resistance is in the range of about 20-30 ohms.

12. An electric arc welder as defined in claim 4 wherein said background current resistance is in the range of about 20-30 ohms.

13. An electric arc welder as defined in claim 2 wherein said background current resistance is in the range of about 20-30 ohms.

14. An electric arc welder as defined in claim 1 wherein said background current resistance is in the range of about 20-30 ohms.

15. An electric arc welder as defined in claim 14 wherein said resistance is the sum of the resistance of a resistor at the positive output of said full wave rectifier and a resistor at the negative output of said full wave rectifier.

16. An electric arc welder as defined in claim 15 wherein the two output resistors have substantially the same ohm value.

17. An electric arc welder as defined in claim 6 wherein said resistance is the sum of the resistance of a resistor at the positive output of said full wave rectifier and a resistor at the negative output of said full wave rectifier.

18. An electric arc welder as defined in claim 17 wherein two output resistors have substantially the same ohm value.

19. An electric arc welder as defined in claim 4 wherein said resistance is the sum of the resistance of a resistor at the positive output of said full wave rectifier and a resistor at the negative output of said full wave rectifier.

20. An electric arc welder as defined in claim 19 wherein the two output resistors have substantially the same ohm value.

21. An electric arc welder as defined in claim 2 wherein said resistance is the sum of the resistance of a resistor at the positive output of said full wave rectifier and a resistor at the negative output of said full wave rectifier.

22. An electric arc welder as defined in claim 21 wherein the two resistors have substantially the same ohm value.

23. An electric arc welder as defined in claim 1 wherein said resistance is the sum of the resistance of a resistor at the positive output of said full wave rectifier and a resistor at the negative output of said full wave rectifier.

24. An electric arc welder as defined in claim 23 wherein the two resistors have substantially the same ohm value.

25. An electric arc welder comprising a power source driven by a main input transformer with a secondary winding creating an output pulsating current across the electrode and workpiece of a welding operation and a background current circuit including a full-wave rectifier with AC input and a rectified DC output connected in parallel with said power source.

26. An electric arc welder as defined in claim 25 wherein said background current resistance is in the range of about 20-30 ohms.

27. An electric arc welder as defined in claim 26 wherein said resistance is the sum of the resistance of a resistor at the positive output of said full wave rectifier and a resistor at the negative output of said full-wave rectifier.

28. An electric arc welder as defined in claim 27 wherein the two resistors have substantially the same ohm value.

29. An electric arc welder as defined in claim 25 wherein said resistance is the sum of the resistance of a resistor at the positive output of said full wave rectifier and a resistor at the negative output of said full-wave rectifier.

30. An electric arc welder as defined in claim 29 wherein the two resistors have substantially the same ohm value.

31. An electric arc welder comprising a full-wave gated bridge driven by the secondary of an input transformer with an output connected across the electrode and workpiece of a welding operation and a background current circuit including a full-wave rectifier with an AC input and a rectified DC output and a current control resistance, said background current circuit connected in series with said welding operation, wherein said input of said full wave rectifier is connected in parallel with said secondary winding driving said gated bridge.

32. An electric arc welder as defined in claim 31 wherein said gated bridge includes alternately gated SCRs.

33. An electric arc welder as defined in claim 32 wherein said gated bridge is parallel with said welding operation to perform DC welding.

34. An electric arc welder as defined in claim 31 wherein said gated bridge is parallel with said welding operation to perform DC welding.

35. An electric arc welder as defined in claim 32 wherein said gated bridge is in series with said welding operations to perform AC welding.

36. An electric arc welder as defined in claim 31 wherein said gated bridge is in series with said welding operations to perform AC welding.

37. An electric arc welder comprising a gated full-wave bridge, two pairs of reverse polarity switches and driven by the secondary of an input transformer with an output connected across the electrode and workpiece of a welding operation and a background current circuit comprising a diode and a resistor in parallel with each switch in said bridge.

38. An electric arc welder as defined in claim 37 wherein said gated bridge is parallel with said welding operation to perform DC welding.

39. An electric arc welder as defined in claim 37 wherein said gated bridge is in series with said welding operations to perform AC welding.

40. An electric arc welder as defined in claim 39 wherein said diodes are connected in a full wave rectifier and said resistors are a positive output resistor from said rectifier to said bridge and a negative output resistor from said bridge to said rectifier.

41. An electric arc welder as defined in claim 38 wherein said diodes are connected in a full wave rectifier and said resistors are a positive output resistor from said rectifier to said bridge and a negative output resistor from said bridge to said rectifier.

42. An electric arc welder as defined in claim 37 wherein said diodes are connected in a full wave rectifier and said resistors are a positive output resistor from said rectifier to said bridge and a negative output resistor from said bridge to said rectifier.